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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/616,310

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Hagai Aronowitz

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EXAMINER

JACKSON, JAKIEDA R

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

06/26/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/616,310	Applicant(s) ARONOWITZ, HAGAI	
	Examiner JAKIEDA R. JACKSON	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-4, 7, 15, 17-18, 24, 26-27, 41-43, 51, 53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-4, 7, 15, 17-18, 24, 26-27, 41-43, 51 and 53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. In response to the Office Action mailed November 20, 2008, applicant submitted an amendment filed on February 19, 2009, in which the applicant traversed and requested reconsideration.

Response to Arguments

2. Applicant argues that the cited art alone or in combination fails to teach flexible endpoints and a confusion matrix. Applicant's arguments are persuasive, but are moot in view of new grounds of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claim 1, 3-4, 7, 15, 17-18, 24, 26-27, 41-43, 51 and 53** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf et al. (PGPUB 2003/0204399), hereinafter referenced as Wolf in view of Chou et al. (USPN 5,805,772), hereinafter referenced as Chou, Wegmann et al. (USPN 6,224,636), hereinafter referenced as Wegmann and Garner et al. (USPN 7,310,600), hereinafter referenced as Garner.

Regarding **claim 1**, Wolf discloses a method, system and article, hereinafter referenced as a method for processing a speech signal, comprising:

using a memory, coupled to a processor (paragraph 0053), to receive an input speech signal (spoken queries; column 1, paragraph 0013);

using the processor to construct a phoneme lattice (paragraph 0053) for the input speech signal (lattice; column 2, paragraphs 0020-23 with column 4, paragraph 0055);

searching the phoneme lattice to produce a likelihood score for each potential path (likelihood of paths; column 3, paragraph 0038);

determining a processing result for the input speech signal based on the likelihood score of each potential path (likelihood scores of path; column 3, paragraphs 0033-0040);

segmenting an input speech signal into frames (word-level lattices; column 2, paragraph 0020 with column 3, paragraphs 0033-0040);

extracting acoustic features for a frame of the input speech signal (acoustic information; column 2, paragraphs 0022-0023 with column 1, paragraph 0013);

determining K-best initial phoneme paths leading to the frame based on a first score of each potential phoneme path leading to the frame (best scoring path; column 3, paragraphs 0033-0040); and

calculating a second score for each of the K-best phoneme paths for the frame (confidence scores; column 2, paragraph 0021 with column 3, paragraphs 0033-0040), but does not specifically teach determining vertices and arc parameters of the phoneme

lattice for the input speech signal and an extension of at least one of first and second arcs such that the two arcs are directly connected at a different frame.

Chou discloses a speech recognition method (speech recognition; column 1, lines 7-10) comprising determining arc parameters of the phoneme lattice for the input speech signal (arc; column 3, lines 6-13 and column 4, lines 9-25 with column 6, lines 19-40);

wherein searching the phoneme lattice comprises:

receiving a phoneme lattice (figures 3);

traversing the phoneme lattice via potential paths (traversing the paths; column 2, line 55 – column 3, line 11 and column 6, lines 1-25);

computing a score (score) for a traversed path based on at least one of a phoneme confusion matrix and a plurality of language models (one or more language models; column 3, lines 1-11); and

modifying the score for the traversed path by allowing repetition of phonemes in a path such that at least one of a first arc that ends at a first frame (head) and a second arc that starts at a third frame (tail) is extended so that the first arc and the second arc are directly connect at a second frame (column 14, lines 1-19 and column 5, lines 9-22), reducing search complexity.

Wegmann discloses a method of determining vertices (column 8, line 36 - column 9, line 65), to construct a recognition hypothesis.

Garner discloses a method allowing flexible endpoints (figures 2-3 with column 29, lines 28-65), to provide an efficient dynamic programming matching between the input query and the lattice achieved.

As shown above, all the steps claimed in claim 1 were known in the prior art, as evidenced in the above references, and one skilled in the speech recognition art could have combined the claimed steps by merely adding them together, with no change in their respective functions, and the combination would have yielded predictable results or the sum of the respective functions, to one of ordinary skill in the art at the time of the invention, *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007). Accordingly, the combination of Wolf, Chou, Wegmann and Garner would have been obvious to one of ordinary skill in the art at the time of invention, because they are all in the same field of endeavor and similar in scope.

Regarding **claim 3**, it is interpreted and rejected for the same reasons as set forth in claim 1. In addition, Wolf discloses a method further comprising:

clustering together K-best initial phoneme paths for at least one consecutive frame (single best scoring path; column 3, paragraphs 0033-0040); and

selecting M-best refined phoneme paths among the clustered phoneme paths based on second scores of these paths (best scoring path; column 3, paragraphs 0033-0040).

Regarding **claim 4**, Wolf discloses a method wherein the first score and the second score comprise a score based on phoneme acoustic models and language models (model; column 2, paragraph 0024 with column 4, paragraphs 0051-0055).

Regarding **claim 7**, Wolf discloses a method wherein determining the processing result comprises determining at least one of the following: at least one candidate textual representation of the input speech signal and a likelihood that the input speech signal contains targeted keywords (text transcript; column 1, paragraph 0006).

Regarding **claim 15**, it is interpreted and rejected for the same reasons as set forth in claim 1. In addition, Wolf discloses a method for distributing speech processing, comprising:

- using a memory, coupled to a processor (paragraph 0053), to receive an input speech signal (spoken queries; column 1, paragraph 0013);

- using the processor to construct a phoneme lattice (paragraph 0053) for the input speech signal (lattice; column 2, paragraphs 0020-0023 with column 4, paragraph 0055);

- transmitting the phoneme lattice from the client to a server (column 3, paragraphs 0033-0040 with column 4, paragraph 0040); and

- searching the phoneme lattice to produce a result for the input speech signal for the purpose of at least one of recognizing speech and spotting keywords, in the input speech signal (speech recognition; column 3, paragraphs 0033-0040 with column 4, paragraph 0040).

Regarding **claim 17**, it is interpreted and rejected for the same reasons as set forth in claim 15. In addition, Wolf discloses a method further comprising:

- clustering together K-best initial phoneme paths for at least one consecutive frame (single best scoring path; column 3, paragraphs 0033-0040); and

selecting M-best refined phoneme paths among the clustered phoneme paths based on second scores of these paths (best scoring path; column 3, paragraphs 0033-0040).

Regarding **claim 18**, Wolf discloses a method wherein the first score and the second score comprise a score based on phoneme acoustic models and language models (model; column 2, paragraph 0024 with column 4, paragraphs 0051-0055).

Regarding **claims 24**, it is interpreted and rejected for the same reason as set forth in claim 15. In addition, Wolf discloses a speech processing system comprising:

a plurality of models for lattice construction (column 3, paragraphs 0033-0040 and column 4, paragraph 0055); and

a plurality of models for lattice search (column 3, paragraphs 0033-0040 and column 4, paragraph 0055).

Regarding **claim 26**, Wolf discloses a system wherein the first score and the second score comprise a score based on phoneme acoustic models and language models (model; column 2, paragraph 0024 with column 4, paragraphs 0051-0055).

Regarding **claim 27**, Chou also teaches a system wherein a plurality of models for lattice construction comprises a plurality of language models (one or more language models; column 3, lines 1-11). In addition, Garner discloses a phoneme confusion matrix (column 8, line 13 – column 9, line 30 with column 29, line 17 – column 30, line 19).

Regarding **claims 41**, Chous discloses an article wherein content for searching the phoneme lattice comprises:

receiving a phoneme lattice (figure 3);
traversing the phoneme lattice via potential paths (traversing the paths; column 2, line 55 – column 3, line 11 and column 6, lines 1-25);
computing a score (score) for a traversed path based on at least one of a phoneme confusion matrix and a plurality of language models (one or more language models; column 3, lines 1-11); and
modifying the score for the traversed path (column 14, lines 1-19 and column 5, lines 9-22).

Regarding **claims 42**, Chou wherein content for modifying the score comprises content for adjusting the score, by at least one of the following: allowing repetition of phonemes (column 14, lines 1-19 and column 5, lines 9-22). In addition, Garner discloses allowing flexible endpoints for phonemes in a path (figure 2 and 3 with column 29, lines 17-65).

Regarding **claim 43**, Wolf discloses an article wherein determining the processing result comprises determining at least one of the following: at least one candidate textual representation of the input speech signal and a likelihood that the input speech signal contains targeted keywords (text transcript; column 1, paragraph 0006).

Regarding **claim 51**, it is interpreted and rejected for the same reasons as set forth in claim 1. In addition, Wolf discloses a method for distributing speech processing, comprising:

receiving an input speech signal by a client (spoken query; column 3, paragraphs 0033-0040);

constructing a phoneme lattice for the input speech signal by the client (lattice; column 3, paragraphs 0033-0040 with column 4, paragraph 0040);

transmitting the phoneme lattice from the client to a server (column 3, paragraphs 0033-0040 with column 4, paragraph 0040); and

searching the phoneme lattice to produce a result for the input speech signal for the purpose of at least one of recognizing speech and spotting keywords, in the input speech signal (speech recognition; column 3, paragraphs 0033-0040 with column 4, paragraph 0040).

Regarding **claim 53**, it is interpreted and rejected for the same reasons as set forth in claim 51. In addition, Wolf discloses an article further comprising:

clustering together K-best initial phoneme paths for at least one consecutive frame (single best scoring path; column 3, paragraphs 0033-0040); and

selecting M-best refined phoneme paths among the clustered phoneme paths based on second scores of these paths (best scoring path; column 3, paragraphs 0033-0040).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAKIEDA R. JACKSON whose telephone number is (571)272-7619. The examiner can normally be reached on Monday-Friday from 5:30am-2:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 571-272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jakieda R Jackson/
Examiner, Art Unit 2626
June 17, 2009